III. "Electrostatic Capacity of Glass." By J. Hopkinson, D.Sc., M.A. Communicated by Prof. Sir William Thomson, F.R.S. Received May 17, 1877.

(Abstract.)

The instruments used in the experiments were—a guard-ring condenser the distance between the plates of which could be varied and measured; a sliding condenser which could be adjusted so that its capacity was equal to the former; the quadrant electrometer used as an electroscope; a battery of 72 Daniell's elements.

The method of experiment was to connect the middle of the battery with the lower plate of the guarding condenser and with the case of the electrometer, to charge one condenser from one pole of the battery, the other from the opposite pole, to insulate both, add their charges, and then connect them to the quadrant of the electrometer. The condensers are equal when there is no deflection of the image. Two experiments are needed in each case—1st, the glass plate is introduced into the guard-ring condenser, and the sliding condenser is made equal to it; 2nd, the glass plate is removed, and the guard-ring condenser is made equal to the sliding condenser. The two readings of the screw which measures the distance of the plates of the former give the specific inductive capacity of the glass.

Four samples of flint glass were successfully examined with the following results:—

	Density.	Electrostatic capacity.	Ratio.	Index of Refraction for line D.
Light flint	3·2	6·85	2·14	1·574
Double extra dense flint	4·5	10·1	2·25	1·710
Dense flint	3·66	7·4	2·02	1·622
Very light flint	2·87	6·57	2·29	1·541

Two samples of the first of these glasses were examined, taken from different meltings, and made at different times; they gave the same result. It will be remarked that these determinations do not bear out Prof. Maxwell's conclusion that the square of the refractive index for long waves is equal to the product of the electrostatic capacity and the magnetic permeability. The quotient electrostatic capacity ÷ density for these glasses and also for solid paraffin lies between 2·0 and 2·3.